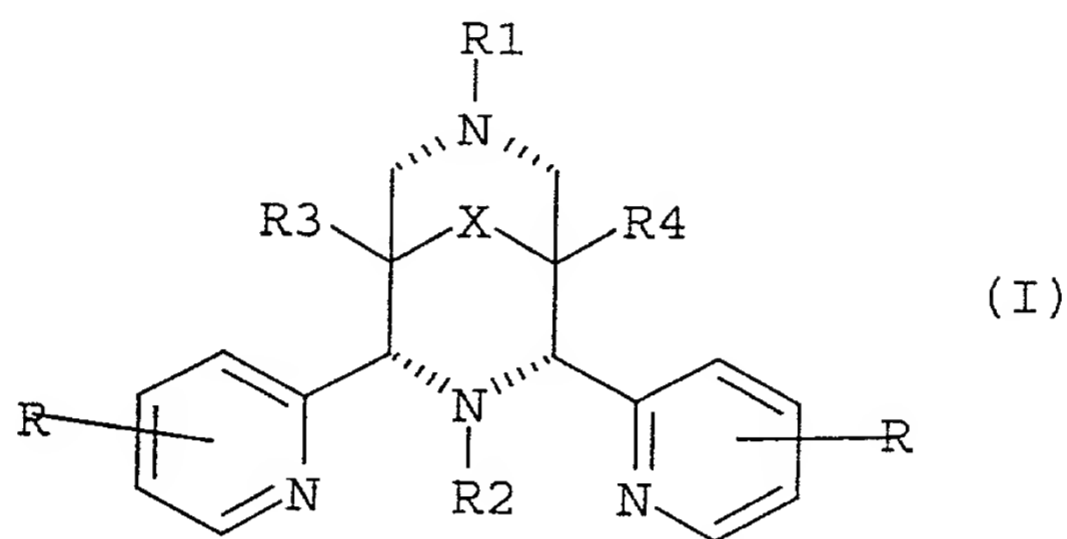


CLAIMS:

1. A bleaching composition comprising:

- a) a monomer ligand or transition metal catalyst thereof of
 5 a ligand having the formula (I):



wherein each R is independently selected from: hydrogen, F,
 10 Cl, Br, hydroxyl, C1-C4-alkylo-, -NH-CO-H, -NH-CO-C1-C4-alkyl, -NH₂, -NH-C1-C4-alkyl, and C1-C4-alkyl;

R1 and R2 are independently selected from:

C1-C4-alkyl,

C6-C10-aryl, and,

- 15 a group containing a heteroatom capable of coordinating to a transition metal, wherein at least one of R1 and R2 is the group containing the heteroatom;

R3 and R4 are independently selected from hydrogen, C1-C8 alkyl, C1-C8-alkyl-O-C1-C8-alkyl, C1-C8-alkyl-O-C6-C10-aryl,
 20 C6-C10-aryl, C1-C8-hydroxyalkyl, and $-(CH_2)_nC(O)OR_5$

wherein R5 is independently selected from: hydrogen, C1-C4-alkyl, n is from 0 to 4, and mixtures thereof; and,

X is selected from C=O, $-[C(R_6)_2]_Y-$ wherein Y is from 0 to 3 each R6 is independently selected from hydrogen, hydroxyl,

- 25 C1-C4-alkoxy and C1-C4-alkyl; and,

b) the balance carriers and adjunct ingredients.

2. A bleaching composition according to claim 1, wherein R1 and R2 are both selected from a group containing a heteroatom capable of coordinating to a transition metal.

3. A bleaching composition according to claim 1, wherein the group containing the heteroatom is:

a heterocycloalkyl: selected from the group consisting of:

pyrrolinyl; pyrrolidinyl; morpholinyl; piperidinyl; piperazinyl; hexamethylene imine; 1,4-piperazinyl; tetrahydrothiophenyl; tetrahydrofuranyl; tetrahydropyranyl; and oxazolidinyl, wherein the heterocycloalkyl may be connected to the ligand via any atom in the ring of the selected heterocycloalkyl,

a -C1-C6-alkyl-heterocycloalkyl, wherein the heterocycloalkyl of the -C1-C6-heterocycloalkyl is selected from the group consisting of: piperidinyl; piperidine; 1,4-piperazine, tetrahydrothiophene; tetrahydrofuran;

pyrrolidine; and tetrahydropyran, wherein the heterocycloalkyl may be connected to the -C1-C6-alkyl via any atom in the ring of the selected heterocycloalkyl,

a -C1-C6-alkyl-heteroaryl, wherein the heteroaryl of the -C1-C6-alkylheteroaryl is selected from the group consisting

of: pyridinyl; pyrimidinyl; pyrazinyl; triazolyl; pyridazinyl; 1,3,5-triazinyl; quinolinyl; isoquinolinyl; quinoxalinyl; imidazolyl; pyrazolyl; benzimidazolyl; thiazolyl; oxazolidinyl; pyrrolyl; carbazolyl; indolyl; and isoindolyl, wherein the heteroaryl may be connected to the

C1-C6-alkyl via any atom in the ring of the selected

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heteroaryl and the selected heteroaryl is optionally substituted by -C1-C4-alkyl,

a -C0-C6-alkyl-phenol or thiophenol,

a -C2-C4-alkyl-thiol, thioether or alcohol,

5 a -C2-C4-alkyl-amine, and

a -C2-C4-alkyl-carboxylate.

4. A bleaching composition according to claim 1, wherein:
each R is the same; and $R_3 = R_4$.

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5. A bleaching composition according to claim 1, wherein R_3 and R_4 are the same and are $-(CH_2)_n C(O)O-C1-C4-alkyl$.

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6. A bleaching composition according to claim 1, wherein R_3 and R_4 are selected from the group consisting of $-CH_2OH$, $-C(O)O-C1-C6-alkyl$, and phenyl.

20

7. A bleaching composition according to claim 1, wherein at least one R_1 and R_2 is a 3-C0-C6-alkyl-pyridin-2-yl-C0-C6-alkyl.

8. A bleaching composition according to claim 1, wherein $Y = 1$

25

9. A bleaching composition according to claim 1, wherein R_3 and R_4 are $-C(O)O-C1-C6-alkyl$.

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10. A bleaching composition according to claim 1, wherein at least one of R_1 and R_2 is selected from the group consisting of: 3-ethyl-pyridin-2-ylmethyl, pyridin-2-

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ylmethyl, 3-methyl-pyridin-2-ylmethyl, and 6-amide-pyridin-2-ylmethyl.

11. A bleaching composition according to claim 10, wherein
5 at least one of R1 and R2 is pyridin-2-ylmethyl.

12. A bleaching composition according to claim 1, wherein both R1 and R2 are pyridin-2-ylmethyl and R is H.

10 13. A bleaching composition according to claim 1, wherein X is C=O.

14. A bleaching composition according to claim 1, wherein the bleaching composition comprises the free ligand.

15 15. A bleaching composition according to claim 1, wherein the complex is of the general formula (A1):



20 in which:

M represents a metal selected from Mn(II) - (III) - (IV) - (V), Cu(I) - (II) - (III), Fe(II) - (III) - (IV) - (V), Co(I) - (II) - (III), Ti(II) - (III) - (IV), V(II) - (III) - (IV) - (V), Mo(II) -
25 (III) - (IV) - (V) - (VI) and W(IV) - (V) - (VI);

X represents a coordinating species selected from any mono, bi or tri charged anions and any neutral molecules able to coordinate the metal in a mono, bi or tridentate manner;

30 Y represents any non-coordinated counter ion;
a represents an integer from 1 to 10;

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k represents an integer from 1 to 10;

n represents an integer from 1 to 10;

m represents zero or an integer from 1 to 20; and

L represents a ligand as defined in claims 1 to 12, or
5 its protonated or deprotonated analogue.

16. A bleaching composition according to claim 15, wherein
M represents a metal selected from Fe(II) - (III) - (IV) - (V).

10 17. A bleaching composition according to claim 16, wherein
M represents a metal selected from Fe(II) and Fe(III).

18. A ligand of formula (I) according to claim 1 or a
transition metal catalyst thereof with the proviso that the
15 following compounds are excluded:

dimethyl 2,4-di-(2-pyridyl)-3,7-bis-(pyridin-2-ylmethyl)-
3,7-diaza-bicyclo[3.3.1]nonan-9-one-1,5-dicarboxylate;
1,5-bis-(hydroxymethylene)-2,4-di-(2-pyridyl)-3,7-bis-
(pyridin-2-ylmethyl)-3,7-diazabicyclo[3.3.1]nonan-9-ol;
20 dimethyl 2,4-di-(2-pyridyl)-3,7-bis-(pyridin-2-ylethyl)-3,7-
diaza-bicyclo[3.3.1]nonan-9-one-1,5-dicarboxylate;
dimethyl 2,4-di-(2-pyridyl)-3-(5-carboxypentyl)-7-methyl-
3,7-diaza-bicyclo[3.3.1]nonan-9-one-1,5-dicarboxylate;
dimethyl 2,4-di-(2-pyridyl)-3-(2-methoxyethyl)-7-methyl-3,7-
25 diaza-bicyclo[3.3.1]nonan-9-one-1,5-dicarboxylate; diethyl-
2,4-dipyridyl-7-picolyl-3,7-diaza-bicyclo-[3.3.1]-nonan-9-
one-1,5-dicarboxylate ; diethyl-2,4-dipyridyl-7-benzyl-3-
hydroxyethyl-3,7-diaza-bicyclo-[3.3.1]-nonan-9-one-1,5-
dicarboxylate; and, dimethyl-2,4-dipyridyl-7-benzyl-3-
30 hydroxyethyl-3,7-diaza-bicyclo-[3.3.1]-nonan-9-one-1,5-
dicarboxylate.

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19. A ligand of formula (I) according to claim 18 or a transition metal catalyst thereof, wherein at least one of R1 or R2 is pyridin-2-ylmethyl and the other is selected from -CH3, -C2H5, -C3H7, and -C4H9.

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20. A perchlorate salt of dimethyl 2,4-di-(2-pyridyl) -3,7-di(pyridin-2-ylmethyl)-3,7-diaza-bicyclo[3.3.1]nonan-9-one-1,5-dicarboxylate (N2Py4).

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